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CENTRALIZADAS

**A REPORT ON FISHERIES STATISTICS
PROGRAM IN PUERTO RICO
FROM 1967 TO 1972**

BY
ROLF JUHL AND JOSE A. SUAREZ CAABRO



CONTRIBUCIONES AGROPECUARIAS Y PESQUERAS
ORGANO OFICIAL DE LOS SERVICIOS AUXILIARES
Y OPERACIONES CENTRALIZADAS

VOLUMEN IV

NUMERO 4

NOVIEMBRE, 1972
SAN JUAN, PUERTO RICO

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INTRODUCTION

Puerto Rico's fishing industry presents a great contrast. A modern, productive and highly capitalized tuna fleet is contrasted with an inshore fishery that has not changed substantially in several generations (Holmsen, 1967).

Evaluation of the inshore marine fisheries of Puerto Rico, using statistical information, started in July 1967 as a project entitled "Fishery Statistical Program" (2-56-R) under authority and financial assistance of the Commercial Fisheries Research and Development Act of 1964 (PL-88-309, as amended) under cosponsorship of the United States Department of the Interior (later Department of Commerce) and the Department of Agriculture, Commonwealth of Puerto Rico. The Institute of Marine Science of the University of Miami acted as technical adviser of this Statistical Project, from July 1967 through June 1969 (Caillouet, García and Higman, 1968 and Caillouet and Higman, 1969); thereafter, it continued under direct management of the Puerto Rico Department of Agriculture and was terminated on June 30, 1972.

The main objective of the project was to establish a system for obtaining data on landings and sales of fish and shellfish in Puerto Rico's inshore fisheries. This, in addition to assisting the local fishing industry, would also fill the statistical needs of the Bureau of Commercial Fisheries (now National Marine Fisheries Service) and other interested agencies. Statistical data collected include number and types of fishing craft, number and quantities of fishing gear and number of fishermen. During the project duration pertinent annual reports were published separately, however the subject one includes a summary of previous work and a detailed account of the final year (1971-1972).

PROCEDURE AND FIELD WORK

Collection of Statistical Data.

To gather the statistical data, the following steps were taken: (a) a sales ticket system was implemented to obtain information on weight and value of local fish and shellfish landings; (b) for the purpose of collecting field data five statistical agents were hired; (c) a list of fish and shellfish nomenclature was prepared of commercially important species; (d) preliminary data was assessed to estimate total landing; (e) fishermen's license data was processed to determine vital statistical and related information; (f) a preliminary fishing survey was conducted in two fishing centers; and (g) publicity releases were circulated to inform the industry. The results of these preliminary steps appear in Caillouet, García and Higman (1968) and Caillouet and Higman (1969).

Source of Data.

Data on each commercial landing were recorded on fish tickets by fish dealers and fishermen, under the advise of statistical agents, at each fishing center. Statistical agents collected and brought these back to the office. Name and address of the dealer, price and value of different species of fish and shellfish were filled on the ticket for each transaction (Figure 1). In the first two years of the project (1967-68 and 1968-69) no information on the different species was obtained, the landing were grouped in first, second and third class of fish only.

The statistical field agents maintain close contact with fish dealers and local fishermen to insure that the records were accurate and transmitted promptly. All data received at the office were checked for accuracy, after which it was summarized by week and processed for publication.

The accuracy of all data and information depended on the willingness of fish dealers and fishermen to cooperate, and

FECHA _____ / _____ / _____
Mes Día Año

PUEBLO _____

NOMBRE _____

Pescador Comprador _____
(A quién vende o compra?)

Clase de Pescado	Peso Total	Precio por Unidad	Precio Total	Artes de Pesca
MERO				
SIERRA				
JUREL				
ATUN				
PARGO				
ARRAYADO				
CHILLO				
COLIRRUBIA				
BALAJI				
PICUA				
RONCO				
DORADO				
CHOPA				
ROBALO				
SAMA				
NEGRA				
CHAPIN				
JAREA				
CAPTAN				
SALMONETE				
PEJE PUERCO				
SARDINA				
LANGOSTA				
JUEY				
PULPO				
CAREY				
CARRUCHO				
OTRAS				
TOTAL				

D N° 14701

Figure 1 — Sample data sheet used to collect landing of fish and shellfish from fish dealers and fishermen.

upon the ability of the statistical agents to gain such cooperation. To check this four surveys were undertaken (one each in 1969-70 and 1971-72, and two in 1970-71) in different fishing centers of the island selected at random. The procedure was as follows: During 15 days a fishery agent gathered data on type of boat, number of crew, gear used, depth of fishing and price of the landing in the selected fishing centers.

Statistical Areas.

The island was divided into four regions for the purpose of reporting fisheries statistics (Figure 2). These were north, south, east and west coast. Each region included several municipalities with varying numbers of fishing centers.

A working area, which includes a certain number of municipalities and fishing centers (Figure 3), was assigned to each agent. Names, areas, and addresses of the statistical agents are the following:

Area "A": Río Grande-Maunabo and Culebra and Vieques Islands. Mr. Jesús García Mercado.

Home Town: Fajardo

Cataño, San Juan and Loíza. Mr. Iván Pérez Moll.
Home Town: San Juan

Area "B": Patillas-Guánica. Mr. Pedro J. Irizarry Ortiz.
Home Town: Ponce

Area "C": Lajas-Aguada. Agent and Supervisor, Mr. Julio Alvarez Rivera.
Home Town: Mayaguez

Area "D": Aguadilla-Dorado. Mr. Miguel A. Raíces Feliciano
Home Town: Arecibo.

A summary of the statistical agents activities appears in Juhl and Suárez-Caabro (1970, 1971) and in Table I.

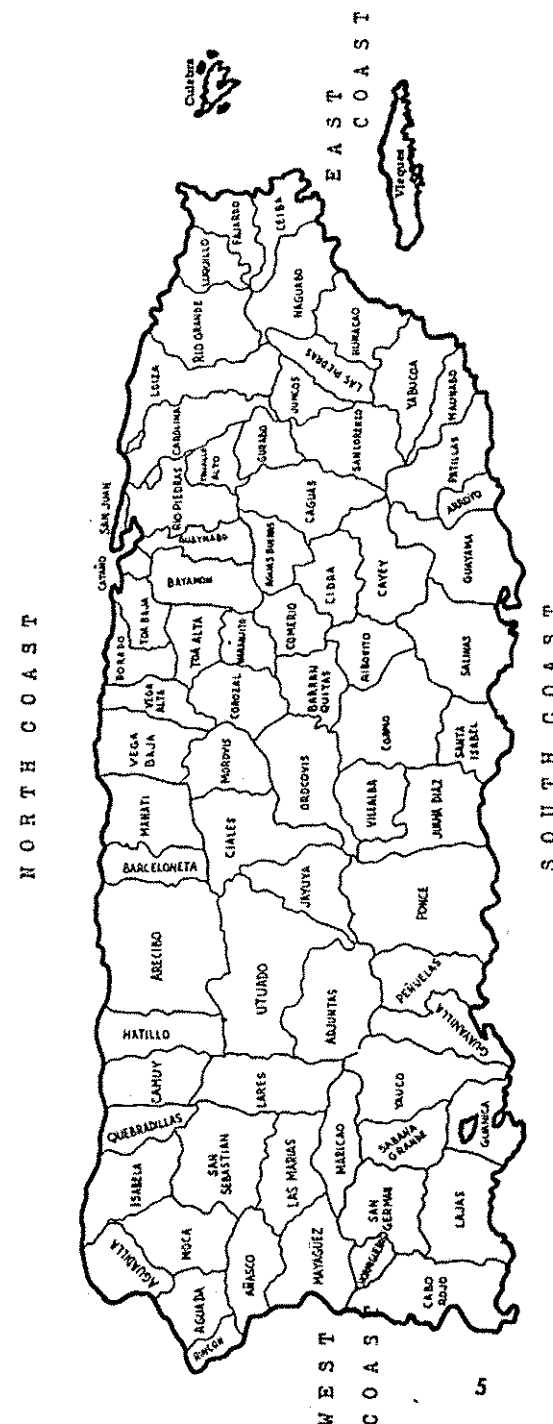


Fig. 2.- Fishing regions and municipalities in Puerto Rico

Species.

The common and scientific names of the species of fish and shellfish reported from 1969-72 are listed in Table II. Some species are reported only by genera or group when, for economic or other reasons, species separation is not practical. This is the case with silk snapper (*Lutjanus vivanus*), blackfin snapper (*L. buccanella*) and vermilion snapper (*Rhomboplites aurorubens*), which are reported as red snapper. Similarly grouper comprises several species such as misty grouper (*Epinephelus mystacinus*), Nassau grouper (*E. striatus*), red hind (*E. guttatus*), etc.

Since it is impractical for dealers and fishermen to report the many species separately, statistical agents periodically sample the catches to determine their species composition. Based on this sampling, the percentage composition of landings in Puerto Rico (1971-72) were as follow:

Species	%
Snapper	18
Grunt	11
Grouper	11
Parrotfish	6
Tuna	6
Mackerel	5
Triggerfish	4
Squirrelfish	4
Jack	3
Porgy	3
Other fishes	14
Spiny lobster	7
Conch	4
Other shellfish	4
	100

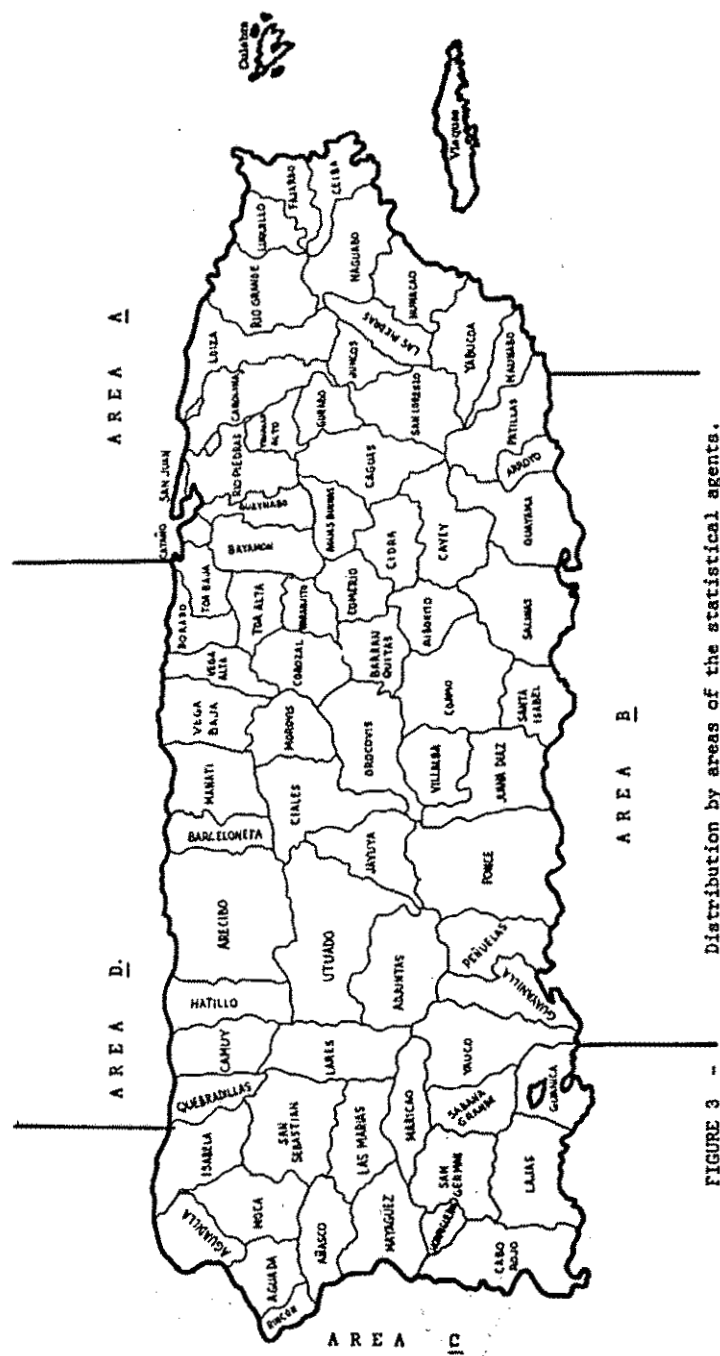


FIGURE 3 - Distribution by areas of the statistical agents.

TABLE I

SUMMARY OF THE STATISTICAL AGENTS ACTIVITIES DURING
1971-72

Months	Visited Municipalities *	Number of Tickets
July	90%	2,578
August	82%	3,410
September	96%	3,034
October	96%	3,057
November	84%	3,277
December	92%	2,514
January	86%	2,509
February	71%	2,337
March	75%	3,255
April	81%	2,632
May	84%	2,687
June	74%	3,072
TOTAL	84%	34,362

Explanation of Tables.

Weight is computed in pounds and value in dollars in the tables.

TABLE II

COMMON AND SCIENTIFIC NAMES OF FISH AND
SHELLFISH REPORTED IN PUERTO RICO, 1969-72

F I S H E S

Snapper:

- ✓ Silk
- ✓ Blackfin
- ✓ Vermilion
- ✓ Yellowtail
- ✓ Lane
- ✓ Mutton
- ✓ Dog
- ✓ Gray
- ✓ Cubera

Lutjanus vivanus
L. buccanella
Rhomboplites aurorubens
Ocyurus chrysurus
Lutjanus synagris
L. analis
L. jocu
L. griseus
L. cyanopterus

Mackerel:

- ✓ King
- ✓ Cero

✓ *Scomberomorus cavalla*
 ✓ *S. regalis*

Grouper:

- ✓ Yellowfin
- ✓ Nassau
- ✓ Red hind
- ✓ Coney
- ✓ Rock hind
- ✓ Misty

Mycteroperca venenosa
Epinephelus striatus
E. guttatus
Cephalopholis fulva
Epinephelus adscensionis
E. mystacinus

Jack:

- ✓ Blue runner
- ✓ Crevalle
- ✓ Black
- ✓ Yellow
- ✓ Greater amberjack
- ✓ Rainbow runner
- ✓ Lookdown
- ✓ Palometa
- ✓ Permit
- ✓ Barbu
- ✓ Snook
- ✓ Barracuda
- ✓ Guaguanche
- ✓ Hogfish
- ✓ Wahoo
- ✓ Atlantic cutlassfish

Caranx crysos
C. hippos
C. lugubris
C. bartholomaei
Seriola dumerili
Elagatis bipinnulatus
Selene vomer
Trachinotus goodei
T. falcatus
Polydactylus virginicus
Centropomus undecimalis
Sphyræna barracuda
S. guaguancho
Lachnolaimus maximus
Acanthocybium solanderi
Trichiurus lepturus

Tuna:

- ✓ Little
- ✓ Skipjack
- Blackfin
- Yellowfin
- Dolphin
- Porgy
- Sheepshead
- ✓ Grunt *Cachius*
- ✓ Parrotfish
- ✓ Triggerfish
- ✓ Goatfish, spotted
- ✓ Goatfish, yellow
- ✓ Squirrelfish
- ✓ Bonefish
- ✓ Yellowfin mojarra
- ✓ Blue marlin
- ✓ Sailfish
- ✓ Atlantic thread herring
- ✓ Ballyhoo
- ✓ Sardine

Euthynnus alleteratus
E. pelamis
Thunnus atlanticus
T. albacares
Coryphaena hippurus
Calamus sp.
Archosargus rhomboidalis
Haemulon sp.
Sparisoma sp.
Balistes vetula
Pseudepeneus maculatus
Mulloidichthys martinicus
Holocentrus sp.
Albula vulpes
Gerres cinereus
Makaira nigricans
Istiophorus platypterus
Opisthonema oglinum
Hemiramphus brasiliensis
Harengula spp.

- ✓ Mullet
- ✓ Trunkfish
- Sardine

junco
clayton

Mugil sp.
Lactophrys sp.
Harengula sp.

CRUSTACEANS

- ✓ Spiny lobster
- ✓ Blue crab
- ✓ Land crab
- ✓ Land crab
- ✓ Shrimp
- ✓ River shrimp

cochis
ambros
juicy

Panulirus argus
Callinectes sp.
Ucides cordatus
Cardisoma guanhumi
Penaeus sp.
Macrobrachium sp.

MOLLUSKS

- ✓ Octopus
- ✓ Conch
- West indian topshell
- ✓ Mangrove oyster

La verna

Octopus vulgaris
Strombus gigas
Cittarium pica
Crassostrea rhizophorae

TURTLES

- Hawksbill turtle
- Loggerhead
- Green turtle
- Leather back

Eretmochelys imbricata
Caretta caretta
Chelonia mydas
Dermochelys coriacea

Most of the fish and shellfish are landed in the round; however, certain species are usually eviscerated and gilled before being landed. However, normally when the fishes are cleaned the fishermen are paid separately for the work.

Value is computed from prices paid to the fisherman. The area value figures are verified by summing the value of all individual landings in the area.

The conch weight figures not include the shell. Land crab weight is computed on the base of 3 to 6 pounds per dozen, according to the region. Lobster and octopus weights are

given in the round. Factors for converting weight of meat to live (round) weight of turtle and land crab are 3.33 and 6.66, respectively. Oyster weight includes the shell.

Publicity.

Advertising about the statistics project was made through several news media, with the cooperation of the Office of Public Relations of the Department of Agriculture.

In 1968-69 and 1969-70 publication of the project was released by radio and television announcements. A short action-movie spot was filmed at Puerto Real, Cabo Rojo (West coast) for television and movies advertising. This was shown in approximately 50 theaters, and also was televised over five major stations during several months. Furthermore, an active campaign of posters was undertaken in all fishing centers since 1968-69.

Publications.

Publication of a monthly news bulletin (Boletín Informativo) about the commercial marine fisheries statistics project commenced in November 1968. The bulletin provided the fishing industry and related agencies with market news from data obtained in the project. The main topics in the bulletins included total production for Puerto Rico (80% actual and 20% estimated); landings by coasts; areas of highest production; fishery activities in different regions; weight and average ex-vessel price per pound of classified fish and shellfish; landings by gear; production of Vieques and Culebra Islands; and quantity and value of fish and shellfish by municipalities. The bulletin was distributed by mail and directly by the agents to fish dealers, fishermen and interested persons (Fishery Bulletins, 1968-1972).

Every year an annual report, titled Status of Fisheries in Puerto Rico, was printed since 1969-70 (Juhl and Suárez-Caabro, 1970, 1971, 1972).

TABLE III

DISTRIBUTION BY REGIONS OF FISH AND SHELLFISH REPORTED IN PUERTO RICO DURING 1971-72 (80% ACTUAL PRODUCTION)

SPECIES	NORTH COAST		SOUTH COAST		EAST COAST		WEST COAST		TOTAL	
	Lb.	\$/lb.	Lb.	\$/lb.	Lb.	\$/lb.	Lb.	\$/lb.	Lb.	\$/lb.
*Silk snapper	88294	76	9462	59	51495	53	248394	67	397645	67
*Yellowtail snapper	32626	45	12395	37	63249	40	29203	42	137473	41
*Lane snapper	10284	45	31160	36	31065	36	38370	50	110879	42
*Mutton snapper	10819	45	4430	36	30030	39	9561	40	54840	40
*Other snapper	11146	46	8163	37	8745	49	9033	38	37087	40
*Mackerel	44404	43	18318	38	89445	38	44774	41	196941	40
*Grouper	9002	45	47217	36	135183	39	137149	26	328551	33
*Jack	7479	41	6268	34	38325	29	35356	30	87428	31
*Snook	20535	41	16923	33	8557	39	3183	41	49198	38
*Barracuda	2030	35	14760	35	21794	37	10396	33	48980	35
*Hogfish	97	39	3531	39	56616	39	644	30	60888	39
*Tuna	10287	39	312	30	9874	29	202630	27	223103	28
*Dolphin	177	35	500	30	887	27	20771	26	22335	26
*Porgy	938	27	8284	25	64017	29	7116	28	80355	28
*Grunt	3321	35	7011	30	204142	29	116867	24	394441	28
*Parrotfish	27	25	7767	21	48788	17	136766	21	193348	20
*Triggerfish	589	18	4091	23	115204	25	43309	15	163193	22
*Goatfish	27	40	26361	29	126067	30	119931	21	272386	26
*Squirrelfish	286	29	2812	20	31949	18	50426	16	85473	17
*Blue Marlin					252	23			252	23
*Sardine	4390	20	84	21	961	15	2375	13	7810	17
*Ballyhoo	270	30	6843	28	1485	22	300	20	8898	27
*Mullet	4976	30	26340	30	24442	29	10909	26	66667	29
*Trunkfish			609	29	23963	25	17231	33	41803	28
*Other fish	3102	24	5177	21	7808	20	41703	25	57790	24
*Total fish	265106	53	331918	33	1194343	32	1329971	33	3121338	34
*Oyster							6426	99	6426	99
*Lobster	2074	106	46146	120	117656	115	67986	108	233862	114
*Land crab	90579	60							90579	60
*Octopus	3496	61	8552	61	3795	22	935	50	16778	58
*Turtle	3498	65	3271	50	9721	44	2543	43	19036	49
*Conch	209	53	12305	45	21315	50	145388	41	179217	42
*Other shellfish	182	31	1341	21	3376	16	5887	31	10786	25
*Total shellfish	100038	62	71615	90	155866	98	235591	61	563311	75
TOTAL	365144	56	403533	43	1350209	40	1565562	36	3684448	40

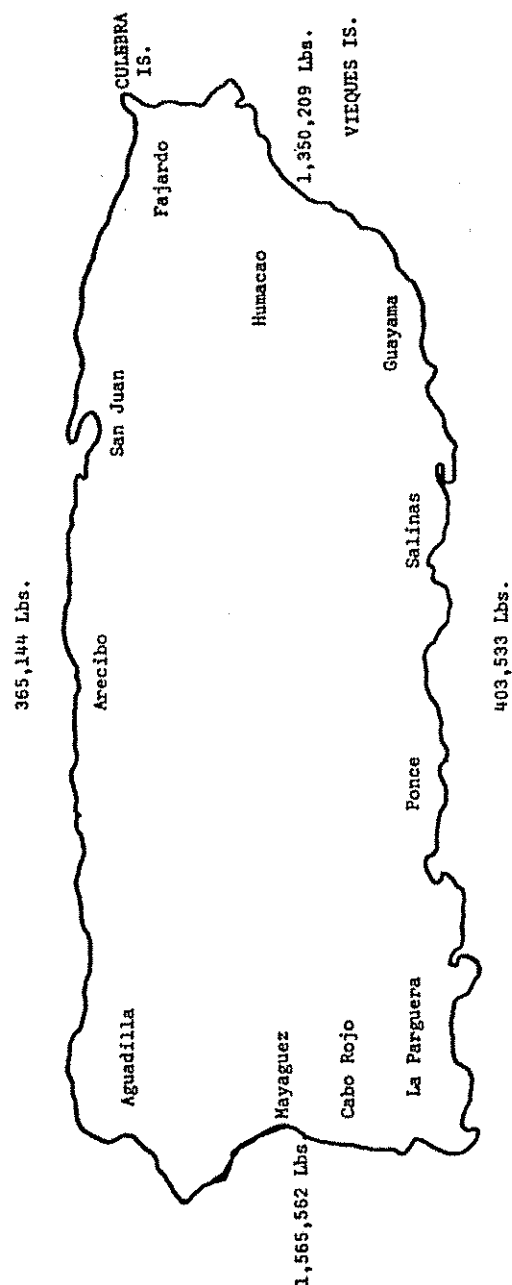


FIGURE 4
Local production of fish and shellfish reported by regions
in Puerto Rico, 1971-72.

RESULTS

Landings by coasts.

Landings by coasts during 1968-1971 appears in Caillouet and Higman (1969) and Juhl and Suárez-Caabro (1970, 1971).

Production in 1971-72 (Figure 4) was the following:

North Coast: From Isabela through Luquillo.

This area only produced 10% of the total landings. Owing to the topography of the shoreline and the conditions of the sea in this area fishermen do not venture out during a great part of the year. Fish pots are not commonly used in this area, instead hand lines, troll lines, and gill nets prevail. In summer, during good weather periods, beach seines, are used in Arecibo, Barceloneta, and Loíza. During the "winter" season, fisheries are reduced to the use of gill nets and cast nets at the mouth of the rivers, or in the calm waters of inlets and bays. In 1971-72 a total of 365,144 pounds of fish and shellfish were taken in the north coast (Table III). The average ex-vessel price per pound was \$0.56. This was the lowest fish production of the Island, and conversely, it was the area where the highest price was paid for fish. The best catches occurred during April, June, August, and September. The fish most commonly taken included mackerel, grouper, snappers (lane, yellowtail and mutton), barracuda and snook

South Coast: From Patillas through Lajas.

This area rated higher than the North Coast. There are productive fishing grounds south of Ponce, at "Caja de Muertos Island", and at Grappler Bank, southeast of Patillas. Fish and spiny lobster pots are the most prevalent fishing gears. Beach seines, troll lines, gill nets, and turtle nets are also used. In 1971-72, 403,533 pounds of fish and shellfish were landed here (Table III). The average ex-vessel price per

pound was \$0.43. The best catches occurred during February, March, and April. The fish most commonly caught were: mackerel, grouper, snapper (mutton, yellowtail and lane) barracuda and snook.

East Coast: From Fajardo through Maunabo including Culebra and Vieques Island.

This ranks second among Puerto Rico's fishing areas. In 1971-72 a total of 1,350,209 pounds of fish and shellfish were landed with an average ex-vessel price of \$0.40 per pound (Table III). This area produced 37% of the total landing of Puerto Rico. This area includes an extensive island shelf which traditionally has been productive, especially for spiny lobster. Fish and spiny lobster pots are the main fishing gear, followed by trolling line, hand line, turtle net and beach seine. The best catches occurred during January, February, March, and April. In order of importance the most commonly taken fish included: snappers (yellowtail, silk and mutton), mackerel, grouper and tuna.

West Coast: From Cabo Rojo through Aguadilla.

This is the best fishing area in Puerto Rico. It produced 42% of the total landing in 1971-72. Relatively productive fishing grounds exist east of this area, including "Tourmaline" and "Las Coronas" Reefs and around "La Mona" and "Desecheo Island"; also, Aguadilla Bay and vicinity area is a good fishing ground, especially for tuna. The most commonly used fishing gear are fish pots, troll and hand lines, and bottom trot lines. In 1971-72 a total of 1,565,562 pounds of fish and shellfish were landed with an average ex-vessel price per pound of \$0.36 (Table III). This was the lowest recorded price on the Island. The best catches occurred during March, September, October, and November. The leading species caught were mackerel and silk snapper, followed by jack, grouper, barracuda, dolphin, and mutton snapper.

Production in Vieques and Culebra Islands.

Landings in Vieques and Culebra Island were difficult to obtain during the years 1967-68 and 1968-69. However, data of landings and value were gathered regularly since 1969-70. Production in Vieques and Culebra Islands are listed in Juhl and Suárez-Caastro (1970, 1971) for the years 1969-70 and 1970-71.

During 1971-72 a total of 348,944 pounds of fish and shellfish were landed in Vieques Island. The ex-vessel price per pound was \$0.35. Spiny lobster reached 5% of the total catch and fish 84%.

Production of fish and shellfish in Culebra Island was lower than in Vieques, 67,296 pounds reported, but the average ex-vessel price was almost double, or \$0.60 per pound. However, in Culebra 41% of the total catch was spiny lobster and 59% fish, which accounts for the higher average price.

Highest Production

The areas of highest production of fish and shellfish recorded since 1969-1970 were as follow:

1969-70 Loíza, Guánica, Fajardo, and Cabo Rojo.

1970-71 Luquillo, Guánica, Fajardo, and Cabo Rojo.

Details of those landings appear in Juhl and Suárez-Caastro (1970, 1971).

The areas of highest production during 1971-72 are the following:

	Pounds	Price/Pound
Luquillo (North Coast)	135,199	\$0.50
Pueblo		
Playa		

Guánica (South Coast)	116,475	0.37
Bahía Guánica		
Salinas-Ensenada		
Fajardo (East Coast)	426,768	0.37
Las Croabas		
Sardinera		
Maternillo		
Demajagua		
Cabo Rojo (West Coast)	1,018,662	0.31
Guanajibo		
Joyuda		
Puerto Real		
Boquerón		
El Combate		
Bahía Sucia		

Operating Units.

To make a meaningful appraisal of the fishing effort in Puerto Rico, information on the number of fishermen, craft and gear were needed. Starting in 1969-70 every fishing center, throughout the island, was surveyed to supplement the statistical project data.

Intensive field work, interviewing and questioning fish dealers, fishermen, Fish and Game Wardens of the Division of Fish and Wildlife, of the Department of Agriculture and other people engaged in marine commercial fisheries, was carried out by the Project Leader and by the statistical agents under his supervision, every year since 1969.

The total number of fishermen was determined from information recorder in 2,131 fishing licensee applications, for the fiscal year 1968-69. Interviews were based on three main questions: fisherman's status (regular, casual, deckhand), type

TABLE IV
SUMMARY OF OPERATING UNITS 1971-72

ITEM	COASTS:				TOTAL, NOT INCLUDING DUPLICATES
	NORTH	SOUTH	EAST	WEST	
<u>Fisherman:</u>	196,293	64,239	46,084	14,528	345,884
(with & without boats)					
Regular	78	84	159	165	486
Casual	205	175	28	100	508
TOTAL	283	259	187	265	994
<u>Fishing craft:</u>					
Motor	144	196	140	152	632
Other	53	27	18	81	179
<u>Fishing gear:</u>					
Beach seine	30	29	15	41	115
Length, yards	8,050	8,212	13,764	12,210	42,236
Pots:	275				
Fish	275	2,652	2,501	3,023	8,451
Lobster	17	100	89	0	206
Gillnet:	177	103	59	53	472
Square yds.	196,293	84,829	30,718	34,044	345,884
Turtle net:	96	216	178	70	560
Square yds.	18,854	64,329	46,084	14,528	143,795
Lines:					
Head	279	119	220	295	913
Hooks	2,119	858	1,196	1,873	6,046
Troll	327	279	283	260	1,149
Hooks	368	279	290	291	1,228
Trot	26	56	16	93	191
Hooks	2,253	9,385	1,970	13,674	27,282
Pole	52	8	13	2	75
Hooks	52	8	13	2	75
Cast net:	240	103	133	95	571
Spear:	38	42	41	24	145
Others:	0	1	12	1	14

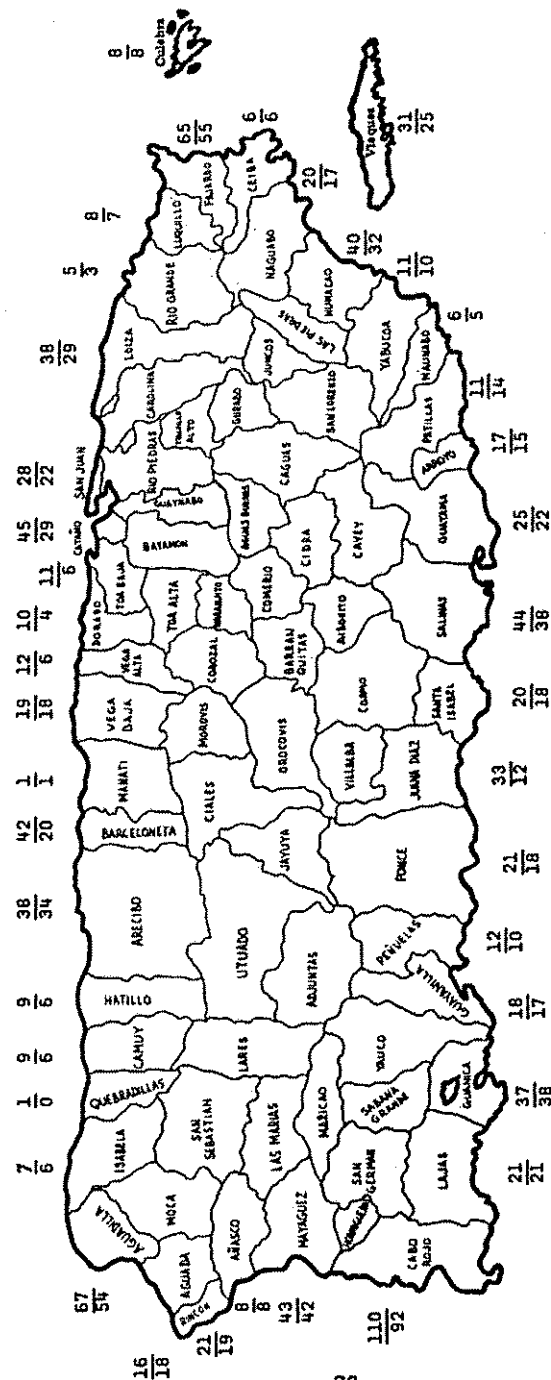


FIGURE 5 -- Distribution of fishermen and craft reported in Puerto Rico, 1971-72.

Fractions mean: $\frac{\text{Numerator} = \text{number of fishermen and denominator} = \text{number of craft.}}$

21.

Table IV shows a summary of the operating units of the local fisheries in Puerto Rico, 1971-72.

Number of fishermen reported during this year is 8% lower than in 1970-71. The number of boats also decreased 7%. The fishing gear units were 4% lower than in 1970-71. Distribution of fishermen and boats through the Island is shown in Figure 5.

The reported number of fish pots, turtle nets, hand lines, troll lines, and poles went down substantially.

Fishing gear.

Landings of fish and shellfish in Puerto Rico by gear started to be published in 1969 in the monthly fishery bulletins and in Juhl and Suárez-Caabro (1971).

Table V shows percentage of fish and shellfish by fishing gear in 1971-72. The most common are fish pot, hand line, troll line, beach seine, and gill net; trot line, spiny lobster pot and cast net were used to a lesser degree. It is noteworthy that 41% of the total catch is obtained by fish pot.

Fishing craft.

The type and number of fishing boats used in Puerto Rico inshore fisheries have not changed substantially since the first survey in fishing craft undertaken by the Project of Fishery Statistics in 1969-70.

TABLE V

**PORCENTAGE OF FISH AND SHELLFISH BY FISHING
GEAR REPORTED IN PUERTO RICO 1971-72**

GEAR	%
Fish pot	41
Spiny lobster pot	Less than 1
Beach seine	11
Gill net	8
Hand line	17
Troll line	11
Spear	2
Trot line	1
Bay hand	8
Cast net	Less than 1
TOTAL	100

The most common type of fishing boat is the outboard motor boat called "yola". Total figures for the years 1969-70 and 1970-71 are 787 and 869, respectively, (Juhl and Suárez-Caabro, 1970, 1971).

Table VI shows distribution in length and propulsion (horse-power) of commercial fishing craft by coastal region, 1971-72. Boats of 16 to 18-foot lengths are the standard throughout the island. Secondly, some row boats of 13 to 15 foot lengths are often used in shallow water areas in the beach seine fishery. Six to ten H.P. motors are the most abundant followed by 16 to 20 H.P. motors larger than these are few.

Summary.

The total recorded landings of fish and shellfish, during the period from July 1967 through June 1972, for Puerto Rico were the following:

<i>Fiscal Year</i>	<i>Landings in pounds</i>
1967-1968	547,600
1968-1969	2,143,200
1969-1970	2,654,400
1970-1971	4,941,500
1971-1972	4,605,600 (20% estimated)

During 1971-72 a total of 3,684,448 pounds (80% actual recorded production) of fish and shellfish were reported from Puerto Rico local fisheries, 85% was fish of various species, 15% shellfish which includes spiny lobster, land crab and turtle. The average ex-vessel price per pound for the entire island was 34 cents for fish (Table VII) and 75 cents for shellfish. Snapper, grunt, grouper, goatfish, parrotfish, triggerfish, and mackerel were the most common fishes caught. Silk snapper reached a very high price, it commanded \$1.25 per pound in some areas. Spiny lobster was the highest priced among the shellfish reaching and ex-vessel of \$1.50 per pound.

Table VIII shows a summary of the production in Puerto Rico in 1971-72 by municipality, value, fishermen, fishing craft and unit of fishing gear. The year production of fish and shellfish was made by 811 fishing craft and 2,000 fishermen, of these 994 were reported as regular and casual fishermen and the remaining until reach 1,006 included deckhand and other persons engaged in Puerto Rico local fisheries.

En 1971-72 there were 12,862 units of fishing gear reported. Fish pots totaled 67% and 33% other gear, mainly hand line and nets. The highest number of fish pots, 3,023, were in the West Coast. However, the highest number of fish pots were in Cabo Rojo area, or 30% of the total. Cabo Rojo is also the area of highest production in Puerto Rico (Table VIII).

The total values of fish and shellfish for Puerto Rico during the period from July 1967 through June 1972, were the following:

<i>Fiscal Year</i>	<i>Value in Dollars</i>
1967-1968	\$ 143,400
1968-1969	609,200
1969-1970	876,000
1970-1971	1,729,525
1971-1972	1,842,224 (20% estimated)

The total ex-vessel value of the local fisheries during 1971-72 was \$1,473,779 (Table VIII, 80% actual recorded production). The distribution of this figure is as follows: North coast, 15%; South coast, 12%; East coast, 35%; and West coast, 38%. It is interesting to note that in the north coast, which is the least productive area, the highest ex-vessel price was paid to the fishermen; while in the west coast, where the production is highest, the ex-vessel price was the lowest.

The progressive increases in volume and value noted since 1967-68 to 1971-72, undoubtedly reflects a more efficient collection of statistical data and not necessarily an increase in production.

DISCUSSION AND RECOMMENDATIONS

During the past five fiscal years a Fishery Statistical Program was undertaken in Puerto Rico. During this period substantial progress was made in the establishment of an effective fishery statistics system.

Prior to 1967 local fish and shellfish production of Puerto Rico was estimated. Under the subject Fishery Statistical Program, information gathered from commercial fish dealers and fishermen indicate that Puerto Rico's local production was about five million pounds of fish and shellfish yearly.

TABLE VI

DISTRIBUTION OF LENGTH AND HORSE-POWER OF PUERTO RICO'S
INSHORE COMMERCIAL FISHING CRAFT BY COASTAL REGION
1971-72

LENGTH (FEET)	COASTS					%
	North	South	East	West	Total	
4 - 6	1	0	0	0	1	0.12
7 - 9	0	0	0	0	0	0.00
10 - 12	7	14	9	10	40	4.98
13 - 15	26	61	23	54	164	20.22
16 - 18	144	131	86	136	496	61.16
19 - 21	13	14	22	10	59	7.28
22 - 24	5	0	13	4	22	2.71
25 - 27	0	1	1	8	10	1.23
28 - 30	0	0	3	7	10	1.23
31 - 33	1	0	1	2	4	0.49
34 - 36	0	0	0	2	2	0.26
More than 36	0	2	0	1	3	0.37
TOTAL	197	223	158	233	811	100.00
Motor (H.P.)						
1 - 5	15	10	0	5	31	4.59
6 - 10	57	89	12	73	231	34.17
11 - 15	88	32	7	28	93	14.05
16 - 20	32	44	37	41	174	25.74
21 - 25	4	8	10	4	26	3.53
26 - 30	0	3	4	0	7	1.04
31 - 35	3	5	41	4	53	7.84
36 - 40	1	7	18	3	29	4.29
41 - 45	1	2	0	1	4	0.59
46 - 50	0	1	0	0	1	0.15
More than 50	1	3	1	224	27	3.93
TOTAL	142	202	180	182	676	100.00

TABLE VII

SUMMARY OF LANDINGS OF FISH AND SHELLFISH IN
PUERTO RICO - 1971-72

REGION	FISH		SHELLFISH		TOTAL	
	Pounds	\$/lb.	Pounds	\$/lb.	Pounds	\$/lb.
North Coast	265,106	53	100,038	62	365,144	55
South Coast	331,918	33	71,615	90	403,533	43
East Coast	1,194,343	32	155,866	96	1,350,209	39
West Coast	1,329,971	33	235,591	61	1,565,562	37
TOTAL	3,121,338	34	563,110	75	3,684,448	40

TABLE VIII

LANDINGS, VALUE, FISHERMEN, CRAFT AND UNITS OF GEAR REPORTED
(80% ACTUAL PRODUCTION) BY MUNICIPALITIES IN PUERTO RICO
1971-72

MUNICIPALITY	QUANTITY (Lb.)	VALUE (Dollars)	FISHER- MEN	CRAFT	GEAR		TOTAL
					POT	OTHERS	
NORTH COAST	373,495	216,463	283	197	292	1,266	1,558
Isabela			7	6	20	29	49
Quebradillas			1	0	0	2	2
Camuy			9	6	0	40	40
Hatillo			9	6	0	33	33
Arecibo	68,293	43,025	38	34	13	187	200
Barceloneta			42	20	67	195	262
Manatí			1	1	0	6	6
Vega Baja	69,800	39,786	19	18	67	109	176
Vega Alta			12	6	0	79	79
Dorado			10	4	16	32	48
Toa Baja			11	6	0	28	28
Cataño			45	29	19	208	227
San Juan	100,203	66,052	28	22	0	138	138
Lofza			38	29	10	119	129
Rio Grande			5	3	27	22	49
Luquillo	135,199	67,600	8	7	53	39	92
SOUTH COAST	397,828	185,143	259	223	2,752	1,037	3,789
Patillas			11	14	220	99	319
Arroyo			17	15	322	151	473
Guayama	50,825	16,264	25	22	394	95	489
Salinas	103,827	66,572	44	38	517	116	633
Santa Isabel			20	18	160	110	270
Juana Díaz	92,838	43,634	33	12	130	66	196
Ponce	33,863	15,577	21	18	167	113	280
Peñuelas			12	10	139	49	188
Guayanilla			18	17	62	53	115
Guánica	116,475	43,096	37	38	260	120	380
Lajas			21	21	381	65	446
EAST COAST	1,323,933	516,510	187	158	3,590	1,170	3,760
Fajardo	426,768	157,904	65	55	733	467	1,200
Ceiba	124,842	67,908	6	6	174	10	184
Naguabo	250,712	90,256	20	17	337	86	423
Humacao	105,371	37,934	40	32	610	257	867
Yabucoa			11	10	70	146	216
Maunabo			6	5	0	13	13
Vieques	348,944	122,130	31	25	480	166	646
Culebra	67,296	40,378	8	8	186	25	211
WEST COAST	1,589,192	555,663	265	233	3,023	732	3,755
Cabo Rojo	1,018,662	338,750	110	92	3,777	481	3,058
Mayaguez	208,483	93,617	43	42	168	81	249
Añasco			8	8	20	20	40
Rincón			21	19	157	80	237
Aguada			16	18	0	45	45
Aguadilla	362,047	123,096	67	54	101	25	126
TOTAL	3,684,448	1,473,779	994	811	8,657	4,205	12,862

Fishing activity is undertaken by 2,000 fishermen using about 900 boats. Number of fishing gear of different types is close to 14,000.

Basic information obtained from the Fishery Statistical Program in previous years has been useful in planning and implementing other fishery development programs in Puerto Rico, as well as providing information on the progress made, if any, in their execution.

The experience gained in the collection of local fishery statistics has shown various trends which are unpredictable, such as reduction and increase in fishing activity in certain fishing centers, shift in species dominance and composition of the catches, changes in gear use, industrial development in traditional fishing areas, introduction of new technology, etc. The effect of these changes can only be determined through a formal fishery statistics program.

For the above reasons it is important to continue with the collection, processing and distributing of commercial fisheries statistics in Puerto Rico at approximately the same level previously established.

The following recommendations should be followed to enable continuation of an effective Fishery Statistical Program:

1. Five field statistical agents should collect statistical data in the fishing centers of the north, south, east, and west of Puerto Rico and adjacent island of Vieques and Culebra.

2. Using a fish ticket system, catches of fish and shellfish should be gathered routinely from fish dealers and fishermen. The information should be collected by species, type of gear, vessel and number of fishermen. The data obtained would be sent to the existing Fishery Laboratory every week and be processed and tabulated weekly.

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